

10 February 1964

MEMORANDUM FOR: Assistant for Plans and Development

THROUGH : Executive Secretary, TDC

SUBJECT : Staff Study [redacted] Proposal for Design Changes 25X1A
for Change Detector, dated 30 January 1964

1. PROBLEM:

The initial design of the change detector was keyed to 2 $\frac{1}{4}$ " x 2 $\frac{1}{4}$ " formats on 70mm perforated film. Specific characteristics of this design are not satisfactory for the formats in use at NPIC.

2. FACTS:

25X1A a. The [redacted] Change Detector is a development based on a Purchase Description prepared at GIMRADA in April 1962. The initial purpose of the device was the partial automation of land mine detection by comparative analysis of drone photography.

25X1A b. The concepts of the proposed developments were reviewed with interest [redacted] of the Plans and Development Staff, NPIC, who believed that several aspects were of direct interest to the Center and the community. 25X1A

c. Accordingly, NPIC entered into a contract [redacted] for the development of the Change Detector on 15 June 1962, at a cost of [redacted]

25X1A d. In June 1963 a contract modification of the original proposal was negotiated to increase the resolution from 20 lines/mm to 50 lines/mm, at an additional cost of [redacted] which changed the total to [redacted] Since 25X1A that time there have been no additional costs. The contractor anticipates no overruns.

25X1A e. During a monitoring visit [redacted] 25X1A [redacted] of GIMRADA on 26 November 1963, impressive performance features of the Change Detector System were demonstrated. The device is not truly a change detector as much as it is a change presenter, however, it appeared that in this latter function it would be of real assistance to the PI in isolating and cataloging change. It was noted that very subtle changes; such as the replacement of an aircraft by another of the same type (but not identical) at the same position on the parking apron, were readily detectable when presented by the flicker mode on the [redacted] device. Equally as impressive were the electro-mechanical servo systems for accomplishing automatic registration and the synchronous spot wobble technique for eliminating the line characteristic of the television display.

f. On the other hand it was also noted that the film transport and the image positioning system were keyed to a $2\frac{1}{4}$ " x $2\frac{1}{4}$ " format on perforated 70mm film and that the transport speed was far too slow to be satisfactory. More than two-hours would be required to transport 100 feet of film. This seemingly absurd rate was due to the fact that each frame was intended to be examined, so only two modes were provided; a frame by frame mode which required 4 seconds per frame and the slow scan mode which was intended for detailed scanning within the frame. It followed that the frame counting system and the image coordinate reference system were also inappropriate.

g. At the same time it was noted that no provision for rotation of the image to obtain various viewing attitudes was considered. The arbitrary position of the image with respect to the film format in the master channel dictated the rotation attitude.

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h. Subsequent discussions [redacted]

[redacted] of GIMRADA resulted in the mutual conviction that these limitations would jeopardize objective evaluation of the system.

i. Accordingly, [redacted] was invited to propose modifications that would overcome these limitations and make the system as versatile as possible without changing the 70mm film size.

j. The resulting proposal describes modifications to accomplish:

(1). handling of 250 ft. rolls of 70mm perforated or unperforated film at velocities from .02 to .20 inches/second for image scanning and 2.4 to 24 inches/second for transports. Both modes are bidirectional.

(2). an infinitely variable frame counting system which will have detent positions for typical format lengths.

(3). an image position reference system which will provide X and Y coordinates of an image point with respect to an arbitrary reference through a virtually limitless range.

(4). a rotation system which will provide simultaneous rotation of both channels through 360° with corresponding compensation in the joystick deflection logic.

3. CONCLUSIONS:

a. The [redacted] Change Detector shows promise of being of real value to the PI as an aid to detailed change analysis. This is true in spite of the limited resolution in the prototype (50 l/mm), since it is anticipated that the equipment may be used in conjunction with a microscope to point up the areas requiring more detailed examination. It is the opinion of many that this resolution will be adequate for many cases without requiring auxiliary analysis.

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b. Limitations inherent in the initial design of the film transport, frame counter and image position reference system would seriously jeopardize evaluation and operational application of the change detector.

c. There is still a requirement for development of a good, versatile, reliable, motorized film transport system which could be incorporated on various roll film viewing devices.

d. The relatively high cost of the [] proposal is justified by the following factors: 25X1A

(1). The Change Detector is a two-channel system and these channels are not identical. Modifications must be made to both channels and considerable independent engineering is required.

(2). Modifications are by nature more costly than independent development.

(3). The contractor has demonstrated excellent design and fabrication capability and maintains high quality standards.

(4). High Quality performance in design and fabrication are essential to successful operation of this instrument.

4. RECOMMENDATIONS:

25X1A a. [] be awarded a CPFF contract amendment
25X1A in accordance with the Subject proposal to accomplish the modifications described therein, at a cost of []

b. The contracting officer be instructed to issue verbal authorization to proceed in order to avoid additional delay in delivery of the instrument.



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